

and/or radial positions of a moving object (e.g., finger) as it is moved in a largely rotational and/or radial manner across the touch pad. In one embodiment, the touch pad that is based on polar coordinates rather than Cartesian coordinates. Other aspects of the invention will become apparent below. In any case, the aspects are not limiting and the various aspects of the invention can be used separately or in combination.

[0031] The present invention will now be described in detail with reference to a few preferred embodiments thereof as illustrated in the accompanying drawings. In the following description, numerous specific details are set forth in order to provide a thorough understanding of the present invention. It will be apparent, however, to one skilled in the art, that the present invention may be practiced without some or all of these specific details. In other instances, well known process steps have not been described in detail in order not to unnecessarily obscure the present invention.

[0032] FIG. 2 is a perspective diagram of a media player 100, in accordance with one embodiment of the present invention. The term "media player" generally refers to computing devices that are dedicated to processing media such as audio, video or other images, as for example, music players, game players, video players, video recorders, cameras and the like. These devices are generally portable so as to allow a user to listen to music, play games or video, record video or take pictures wherever the user travels. In one embodiment, the media player is a handheld device that is sized for placement into a pocket of the user. By being pocket sized, the user does not have to directly carry the device and therefore the device can be taken almost anywhere the user travels (e.g., the user is not limited by carrying a large, bulky and often heavy device, as in a portable computer). For example, in the case of a music player, a user may use the device while working out at the gym. In case of a camera, a user may use the device while mountain climbing. Furthermore, the device may be operated by the users hands, no reference surface such as a desktop is needed (this is shown in greater detail in FIG. 3).

[0033] Media players generally have connection capabilities that allow a user to upload and download data to and from a host device such as a general purpose computer (e.g., desktop computer, portable computer). For example, in the case of a camera, photo images may be downloaded to the general purpose computer for further processing (e.g., printing). With regards to music players, songs and play lists stored on the general purpose computer may be downloaded into the music player. In the illustrated embodiment, the media player 100 is a pocket sized hand held MP3 music player that allows a user to store a large collection of music. By way of example, the MP3 music player may store up to 1,000 CD-quality songs.

[0034] As shown in FIG. 2, the media player 100 includes a housing 102 that encloses internally various electrical components (including integrated circuit chips and other circuitry) to provide computing operations for the media player 100. The integrated circuit chips and other circuitry may include a microprocessor, memory (e.g., ROM, RAM), a power supply (e.g., battery), a circuit board, a hard drive, and various input/output (I/O) support circuitry. In the case of music players, the electrical components may include components for outputting music such as an amplifier and a

digital signal processor (DSP). In the case of video recorders or cameras the electrical components may include components for capturing images such as image sensors (e.g., charge coupled device (CCD) or complimentary oxide semiconductor (CMOS)) or optics (e.g., lenses, splitters, filters). In addition to the above, the housing may also define the shape or form of the media player. That is, the contour of the housing 102 may embody the outward physical appearance of the media player 100.

[0035] The media player 100 also includes a display screen 104. The display screen 104 is used to display a graphical user interface as well as other information to the user (e.g., text, objects, graphics). By way of example, the display screen 104 may be a liquid crystal display (LCD). In one particular embodiment, the display screen corresponds to a 160-by-128-pixel high-resolution display, with a white LED backlight to give clear visibility in daylight as well as low-light conditions. As shown, the display screen 104 is visible to a user of the media player 100 through an opening 105 in the housing 102, and through a transparent wall 106 that is disposed in front of the opening 105. Although transparent, the transparent wall 106 may be considered part of the housing 102 since it helps to define the shape or form of the media player 100.

[0036] The media player 100 also includes a touch pad 110. The touch pad 110 is configured to provide one or more control functions for controlling various applications associated with the media player 100. For example, the touch initiated control function may be used to move an object or perform an action on the display screen 104 or to make selections or issue commands associated with operating the media player 100. In most cases, the touch pad 110 is arranged to receive input from a finger moving across the surface of the touch pad 110 in order to implement the touch initiated control function. The touch pad may be widely varied. For example, the touch pad be a conventional touch pad based on the Cartesian coordinate system, or the touch pad may be a touch pad based on a polar coordinate system (the later will be described in greater detail below).

[0037] The manner in which the touch pad 110 receives input may be widely varied. In one embodiment, the touch pad 110 is configured receive input from a linear finger motion. In another embodiment, the touch pad 110 is configured receive input from a rotary or swirling finger motion. In yet another embodiment, the touch pad 110 is configured receive input from a radial finger motion. Additionally or alternatively, the touch pad 110 may be arranged to receive input from a finger tapping on the touch pad 110. By way of example, the tapping finger may initiate a control function for playing a song, opening a menu and the like.

[0038] In one embodiment, the control function corresponds to a scrolling feature. For example, in the case of an MP3 player, the moving finger may initiate a control function for scrolling through a song menu displayed on the display screen 104. The term "scrolling" as used herein generally pertains to moving displayed data or images (e.g., text or graphics) across a viewing area on a display screen 104 so that a new set of data (e.g., line of text or graphics) is brought into view in the viewing area. In most cases, once the viewing area is full, each new set of data appears at the edge of the viewing area and all other sets of data move over one position. That is, the new set of data appears for each set